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10/816,015

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Bruno Kristiaan Bernard De Man

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GENERAL ELECTRIC COMPANY  
GLOBAL RESEARCH  
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KAO, CHIH CHENG G

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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* BRUNO KRISTIAAN BERNARD DE MAN,  
SAMIT KUMAR BASU, PETER MICHAEL EDIC,  
WILLIAM ROBERT ROSS, and MARK ERNEST VERMILYEA

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Appeal 2009-2067  
Application 10/816,015  
Technology Center 2800

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Decided:<sup>1</sup> April 28, 2009

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Before EDWARD C. KIMLIN, TERRY J. OWENS, and  
JEFFREY B. ROBERTSON, *Administrative Patent Judges*.

KIMLIN, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 1, 3-21, 23-33,

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<sup>1</sup> The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, begins to run from the Decided Date shown on this page of the decision. The time period does not run from the Mail Date (paper delivery) or Notification Date (electronic delivery).

35-37, 39-41, and 43-47. We have jurisdiction under 35 U.S.C. § 6(b).

Claims 1 and 45 are illustrative:

1. An imaging system comprising:

one or more distributed X-ray sources substantially surrounding an imaging volume and configured to generate X-ray radiation towards the imaging volume;

one or more detectors for receiving the X-ray radiation after attenuation in the imaging volume and processing corresponding signals to produce measurement volumetric data; and

a source controller for triggering one or more emitters in the one or more distributed X-ray sources at each instant in time of an image acquisition for creating multiple projections for acquiring volumetric data by the one or more detectors,

wherein the one or more distributed X-ray sources and/or the one or more detectors are arranged about a scanner aperture such that the one or more distributed X-ray sources rotate around the scanner aperture in relation to the imaging volume during an imaging sequence.

45. An imaging system comprising:

one or more distributed X-ray sources substantially surrounding an imaging volume and configured to generate X-ray radiation towards the imaging volume, wherein the one or more distributed X-ray sources comprise at least one stationary distributed source positioned about a scanner aperture;

one or more detectors for receiving the X-ray radiation after attenuation in the imaging volume and processing corresponding signals to produce measurement volumetric data, wherein the one or more detectors comprise at least one distributed detector configured to rotate around the scanner aperture; and

a source controller for triggering one or more emitters in the one or more distributed X-ray sources at each instant in time of an image

acquisition for creating multiple projections for acquiring volumetric data by the one or more detectors.

The Examiner relies upon the following references in the rejection of the appealed claims (Ans. 3):

Hsieh	5,225,980	Jul. 06, 1993
Price	2002/0085674 A1	Jul. 04, 2002
Zhou (hereafter Zhou '064)	2002/0094064 A1	Jul. 18, 2002
Ning	6,403,892 B1	Jan. 07, 2003
Zhou (hereafter Zhou '378)	2004/0213378 A1	Oct. 28, 2004

Appellants' claimed invention is directed to an imaging system and method for scanning a volume to be imaged with at least one stationary distributed X-ray source that is positioned substantially surrounding the imaging volume. The system also comprises one or more detectors for receiving the attenuated X-ray radiation. Also, the X-ray sources and/or detectors are arranged about a scanner aperture such that the distributed X-ray sources rotate around the scanner aperture during an imaging sequence.

Appealed claims 45 and 47 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Zhou '378. The appealed claims also stand rejected under 35 U.S.C. § 103(a) as follows:

- (a) claims 1, 5, 8-10, 12, 14, 15, 17, 18, 23-37, 29, 30, 35, 36, 41, 43, and 44 over Zhou '378 in view of Ning,
- (b) claims 3, 4, 6, 7, 11, 16, 19-21, 28, and 31-33 over Zhou '378 in view of Ning and Zhou '064,
- (c) claim 13 over Zhou '378 in view of Ning and Price, and
- (d) claims 37, 39, 40, and 46 over Zhou '378 in view of Ning and Hsieh.

We have thoroughly reviewed each of Appellants' arguments for patentability. However, we are in complete agreement with the Examiner that the claimed subject matter is unpatentable over the cited prior art. Accordingly, we will sustain the Examiner's rejections for essentially those reasons expressed in the Answer, and we add the following primarily for emphasis.

Appellants do not set forth separate arguments for any particular claim in the separate groups of claims rejected by the Examiner. Accordingly, the separately rejected groups of claims stand or fall together.

We consider first the Examiner's § 102 rejection of claims 45 and 47 over Zhou '378. Appellants do not dispute that Zhou, like Appellants, describes a system and method comprising one or more distributed X-ray sources substantially surrounding an imaging volume and configured to generate X-ray radiation towards the imaging volume, wherein the one or more distributed X-ray sources comprise at least one stationary distributed source positioned about a scanner aperture, one or more detectors for receiving the X-ray radiation after attenuation in the imaging volume and processing corresponding signals to produce measurement volumetric data. The reference also describes a source controller for triggering one or more emitters in the one or more distributed X-ray sources at each instant in time of a image acquisition for creating multiple projections for acquiring volumetric data by the one or more detectors. It is Appellants' contention that Zhou does not describe the system "wherein the one or more detectors comprise at least one distributed detector configured to rotate around the scanner aperture" (claims 45 & 47).

Appellants emphasize that Zhou discloses “[b]y controlling each of the x-ray sources individually, multiple slice projections may be produced, requiring no rotation of the detectors or x-ray source” ([0071], ll. 8-10). However, as acknowledged by Appellants, Zhou goes on to disclose “[a] slight (15 degrees or less) rotation may be incorporated into either the source or the detectors to provide increased radial resolution” ([0071], ll. 10-12). Hence, since Zhou describes a rotation for the detectors, we agree with the Examiner that Zhou describes the claim limitation within the meaning of § 102. While Appellants maintain that “‘slight rotation’ for radial resolution purpose cannot be construed as the rotation about the scanner aperture for the purpose of imaging the object” (Br. 11, fourth para.), Appellants have not offered any compelling reason why such an interpretation of the relevant Zhou disclosure is improper. Appellants’ statement is conclusory without a supporting rationale. Also, as pointed out by the Examiner, claims 45 and 47 do not recite that the rotation about the scanner aperture is for the purpose of imaging the object.

We next consider the §103 rejection of claim 1 over Zhou ‘378 in view of Ning. As set forth by the Examiner, Zhou discloses one or more distributed X-ray sources substantially surrounding an imaging volume whereas Ning discloses source rotation around the scanner aperture in relation to the imaging volume during an imaging sequence. Consequently, based on the collective teachings of Zhou and Ning, we find no error in the Examiner’s legal conclusion that it would have been obvious for one of ordinary skill in the art to modify the system and method of Zhou with the source rotation of Ning in order to effect a more accurate reconstruction of the imaging volume. We are not persuaded by Appellants’ argument that

“[i]f Zhou 378 was to use the imaging apparatus of Ning, then the entire objective of Zhou 378 to reduce the rotational components . . . would be completely negated” (Br. 15, first para.). In our view, one of ordinary skill in the art would have found it obvious to select the known alternatives of rotating and non-rotating X-ray sources with due consideration given to the cost and effectiveness of each. Also, as explained by the Examiner, since Zhou discloses a stationary system for imaging in a circular arc and Ning teaches a system for imaging in a circular arc and an arc sub-orbit, Ning’s disclosure of incorporating rotation (i.e., arc sub-orbit) would be applicable to Zhou’s circular arc imaging. Appellants have not refuted the Examiner’s reasoning that “the teachings of Ning would make it obvious to rotate the arrangement of Zhou et al. (‘378) along an arc sub-orbit” (Ans. 16, last sentence).

Turning to the § 103 rejection over Zhou ‘378 in view of Ning and Zhou ‘064, Appellants submit that Zhou ‘064 does not teach the claimed two-dimensional source arrays since element 404 of reference Fig. 4 is a target structure that is “merely a component of the x-ray source and cannot be construed as a two-dimensional array of source elements” (Br. 16, first para.). However, Appellants have not rebutted the Examiner’s position that electron emitters 402 of Zhou ‘064 are the two-dimensional array of source elements. (Ans. 17, second para.) Thus, Appellants’ argument is not germane to the thrust of the Examiner’s rejection.

Appellants do not present additional substantive arguments against the § 103 rejections of Zhou ‘378 in view of Ning and Price and Zhou ‘378 in view of Ning and Hsieh.

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As a final point, with respect to the § 103 rejections, we note that Appellants base no argument upon objective evidence of non-obviousness, such as unexpected results.

In conclusion, based on the foregoing and the reasons well stated by the Examiner, the Examiner's decision rejecting the appealed claims is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a) (2008).

AFFIRMED

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